A GUIDE TO THE SNAKES OF THE NAIROBI DISTRICT.

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Judged by African standards the snake fauna of Nairobi must be considered poor. To prevent anyone deriving false comfort from this fact, I hasten to add that individuals of a few species are fairly numerous, and of the four commonest Nairobi snakes two kinds are very poisonous. The proportion of venomous to harmless serpents is not so impressive when viewed from the species angle, for of the twenty-one snakes listed below only four are dangerous to man.

It would have been a simple matter to present a more impressive list by adding the names of "probables" or "possibles" from among the remaining hundred and forty forms occurring in British East Africa. Such practices are to be deplored, however, for species listed as probables today are likely to be copied as definite records tomorrow. That the list can be legitimately expanded is certain, for many years have elapsed since I casually searched for snakes in the vicinity of Nairobi. Possibly some additions that have never appeared in the literature are even now to be found in the Coryndon Memorial Museum. I mention this in case anyone assumes that the keys to the species accompanying this article are all-inclusive or final.

List of Species Known from Nairobi District.

LEPTOTYPHLOPIDAE.
Leptotyphlops conjuncta conjuncta (Jan).
Intermediate Worm-snake.

TYPHLOPIDAE.
Typhlops punctatus punctatus (Leach).
Spotted Blind-snake.

BOIDAE.
Eryx colubrinus loveridgei Stull.
East African Sand-boa.
Python sebae (Gmelin).
Common or Rock-python.

COLUBRIDAE.
Dasypeltis scaber scaber (Linné).
Common Egg-eater.
Boaedon lineatus lineatus Duméril and Bibron.
Common House-snake.
Lycophidion capense capense (A. Smith).
Cape Wolf-snake.
Chlorophis neglectus (Peters).
East African Green-snake.
Thrasops jacksonii schmidti Loveridge.
Schmidt's Tree-snake.
Meizodon semiornata (Peters).
Semiornate Snake.
Duberria lutrix abyssinica (Boulenger).
Abyssinian Slug-eater.
Crotaphopeltis hotamboeia hotamboeia (Laurenti).
White-lipped Snake.
Trimerorhinus tritaeniatus multisquamis Loveridge.
Northern Striped-schaapsteker.
Psammophis sibilans sibilans (Linné).
Common Hissing Sand-snake.
Psammophis subtaeniatus sudanensis Werner.
Northern Stripe-bellied Sand-snake.
Aparallactus concolor (Fischer).
Plumbeous Centipede-eater.
Aparallactus jacksonii (Günther).
Jackson's Centipede-eater.

ELAPIDAE.
Elapsoidea sundevalii güntherii Bocage.
Günther's Coral-snake.
Naja nigricollis nigricollis Reinhardt.
Black-collared Cobra.

VIPERIDAE.
Causus rhombeatus (Lichtenstein).
Rhombic Night-adder.
Bitis arietans (Merrem).
Puff Adder.

In the preceding list family names have been capitalized and certain changes in them may puzzle those unacquainted by taxonomic procedure as laid down by the International Commission on Zoological Nomenclature. Thus LEPTOTYPHLOPIDAE replaces GLAUCONIIDAE because a family must have a typical genus, and the type genus *Glauconia* of Gray (1845) was found to be antedated by *Leptotyphlops* of Fitzinger (1843). In compliance with the law of priority *Glauconia* becomes a synonym and consequently involves a change in the family name.

It will be noted that the name of the author of *conjuncta* appears in parentheses. This is because Jan, when describing his new species, did not refer it to the genus *Leptotyphlops* in which it is now placed. Parentheses around an author's name are an indication that he gave it a different generic name to the one now recognised. Stull, on the contrary, though she called her new subspecies *Eryx thebaicus loveridgei,* did refer it to the genus *Eryx*. The fact that *thebaicus* was later shown to be a synonym of *colubrinus* does not require that her name be put in parentheses.

Priority requires that the original spelling *Boaedon* (not *Boodon*), *Lycophidion* (not *Lycophidium*), and *Naja* (not *Naia*) be used. Other generic changes which will vex the field naturalist are *Thrasops* (*Rhamnophis*), *Meizodon* (for African *"Coronella"* as distinct from the true *Coronella* of Europe and North Africa), *Duberria* (*Homalosoma*), *Crotaphopeltis* (for African *"Leptodeira"* as distinct from the true American *Leptodeira*), *Elapsoidea* (*Elapechis*). These changes are really significant evidence of advances made in our understanding of the relationships of African snakes (suborder SERPENTES of which OPHIDIA is a synonym). These advances show that herpetologists have not been idle during the era of improved petrol engines and more efficient aircraft!

Even the all-important law of priority has been provided with loopholes, for in cases where a generic change is of such a nature as to cause greater confusion than it seeks to remove, it can be set aside by a majority vote of the Commission. Two of the names in the above list call for such action by the Commission when it resumes sittings after the war. I refer to *Trimerorhinus* and *Bitis,* which are generally conceded to be synonyms of *Cerastes* and *Cobra*. Obviously the employment of these names in a new sense would have deplorable results in medical literature. To apply the name *Cobra,* popularly associated with a snake whose venom possesses strikingly different properties from that of the vipers or adders, to the African Puff-adder and its numerous allies of the genus *Bitis* would result in confusion where there is none at present.

While the real basis for the classification of snakes depends largely on characters of dentition and cranial structure, it is possible to diagnose the species by external features when dealing with those from a restricted area such as the Nairobi district. To facilitate this I have devised synopses or keys which should lead one promptly to the right species. Employment of these keys for the identification of snakes taken at Mombasa or Kisumu is likely to prove misleading except in so far as allocation to the correct family. It is assumed that the snake to be classified is dead, but once the student has familiarised himself with deceased reptiles he will soon be able to recognise those of the district at sight.

Except for persons of unusually keen sight, the preliminary identifications of at least the smaller snakes will make a strong magnifying glass necessary. A watchmaker's glass with clockwork-spring attached so as to hold the glass in position over the eye, leaves both hands free for holding the snake. Before attempting to use the keys it is well to make three scale-counts and jot them down on paper for reference.: (1) Ascertain midbody approximately by folding the snake snout to anus, then count the scale-rows from the ventral series (Fig. 1) round the body back to, but not including, the ventral series. (2) Count the ventrals (except in worm-snakes or blind-snakes) from the first transversely enlarged one on the throat to, but not including, the anal shield or shields covering the anus. To avoid losing one's place, counting is best done by placing the left thumbnail on the scale and running it along while counting. (3) Similarly count the shields beneath the tail (subcaudals), commencing with the first large pair posterior to the anus and continuing, but not including, the terminal pointed scute.

Following completion of the identification, should the student wish to check his finding by comparison with a coloured plate, he is likely to find one in *A Guide to the Snakes of Uganda* by Col. C. R. S. Pitman (Uganda Society, Kampala, 1938) for this work includes all the species, though not necessarily the same subspecies, mentioned here. Detailed descriptions of all except four of the most recently described subspecies will also be found in one or other of the three volumes of Dr. G. A. Boulenger's *Catalogue of the Snakes in the British Museum* (British Museum, N.H., London, 1893-1896). These books are available in the reference library of the Coryndon Memorial Museum. At the same time it should be remembered that our knowledge of the range of variation of many species has been greatly extended since the publication of these volumes fifty years ago.

The accompanying figures are adapted from Boulenger's *List of the Snakes of East Africa, North of the Zambesi and South of the Soudan and Somaliland, and of Nyassaland* (*Proc. Zool. Soc., London,* 1915, pp. 611-640), a paper which is very much out of date.

KEY TO DETERMINE THE FAMILIES OF NAIROBI SNAKES.

(1) Body encircled by small scales more or less uniform in size 2

Body not encircled by small scales owing to presence on belly of a longitudinal series of transversely enlarged plates known as ventrals (Fig. 1) 3

(2) Ocular shield bordering the mouth (Fig. 2); 14 scales round middle of body; tail three times as long as broad ..... LEPTOTYPHLOPIDAE (worm-snakes)

Ocular not bordering the mouth (Fig. 3); 18 or more scales round middle of body; tail as long as or only slightly longer than broad ..... TYPHLOPIDAE (blind-snakes)

(3) Vestiges of hind limbs in the shape of small spurs visible on either side of the anus; ventral shields narrower than the body ..... BOIDAE (boas and pythons)

No vestiges of hind limbs; ventral shields as broad as, or nearly as broad as, the body 4

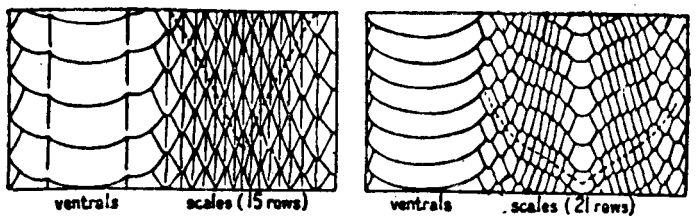
(4) No enlarged poison fangs at front of upper jaw ..... COLUBRIDAE (ordinary snakes)

One or more pairs of enlarged poison fangs on either side at front of upper jaw (Fig. 4) 5

(5) Poison fangs grooved, immovable, not enclosed in a very large sheath of membrane ..... ELAPIDAE (cobras and corals)

Poison fangs perforated, movable, folded back when not in use, enclosed in a very large sheath of membrane ..... VIPERIDAE (vipers and adders)

TEXT-FIGURE 1.

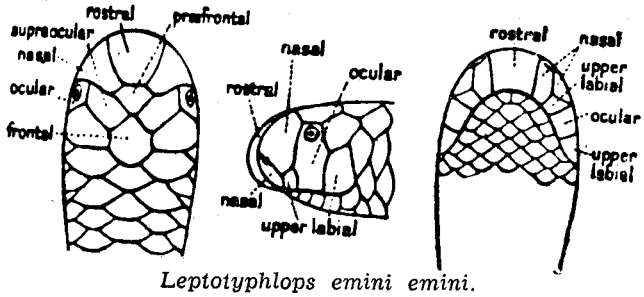


A. B.

A. Ventrals of a tree snake with lateral keels, each dorsal with a median keel.

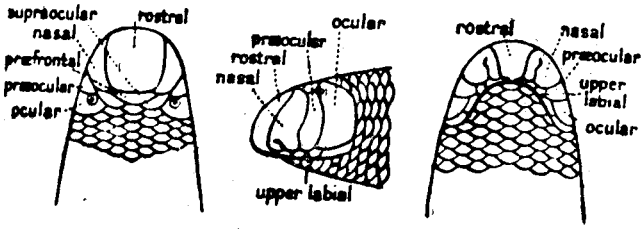
B. Ventrals of a tree snake without any keels, dorsals oblique but all smooth.

TEXT-FIGURE 2.



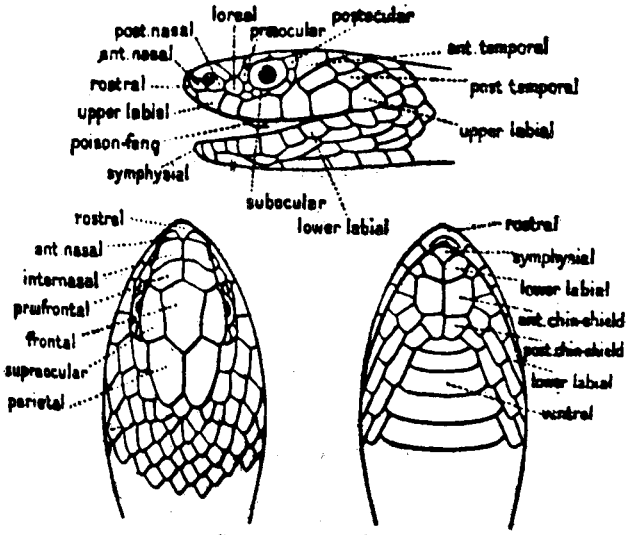
Leptotyphlops emini emini.

TEXT-FIGURE 3.



Typhlops punctatus punctatus.

TEXT-FIGURE 4.



Causus rhombeatus.

Worm-snakes (Leptotyphlopidae).

Least snake-like of any serpent to be encountered around Nairobi, is the Intermediate Worm-snake (*Leptotyphlops c. conjuncta*). Less than 8 inches in length, and but little thicker than the lead in an ordinary pencil, its jet black colouring at once distinguishes this species from a worm, though, of course, it has scales, skull, and vertebrae. Indeed it could be better compared with mercury, so smoothly does it appear to "flow" from a restraining hand. Nor need one be afraid to handle a worm-snake, for it is not only non-poisonous, but has no teeth in the upper jaw. Those in the lower jaw are designed to assist in holding the termites ("white ants") on which these little reptiles subsist.

With the object of providing food for some captive worm-snakes, I once made the mistake of placing in their cage a portion of "comb" from a termitarium. Next morning one of the worm-snakes was lying dead, apparently killed by two big-jawed, soldier termites that were still biting the body. Worm-snakes are most likely to be found in situations harbouring abundance of their prey—in, or under, rotting logs, or among the roots of grass being removed during the clearing of a camp site. It is after heavy rain, however, that most people see their first worm-snake. At such times the tiny reptile may be found wriggling on path or road, having been flooded out of its retreat. At Entebbe, I recovered an Intermediate Worm-snake from the stomach of an Irregular Burrowing-adder (*Atractaspis irregularis*). In Kenya, the Intermediate Worm-snake ranges from Lake Victoria to Mombasa, and at times has been confused with Emin's Worm-snake (*L. e. emini*) which differs in having its rostral shield separated from the supraocular (Fig. 2).

Blind-snakes (Typhlopidae).

Another group of burrowing snakes, differing from the worm-snakes in having teeth only in the upper, instead of the lower, jaw, are commonly called "blindworms" by Europeans as they bear some resemblance to the limbless lizard known as a blindworm in Britain. A better designation for the African reptile is blind-snake, though this is also a misnomer for the tiny eye is usually to be distinguished beneath a shield called the ocular (Fig. 3). With most blind-snakes the only time when the eye is not visible is during a brief period preceding the shedding of the skin's outer cuticle. As in the worm-snakes, the gape of a blind-snake is so small that the reptile is incapable of biting even a little finger. The somewhat shark-like mouth (Fig. 3) is situated on the underside of the head.

One species, the Spotted Blind-snake (*Typhlops p. punctatus*), has been recorded as taken near Nairobi. If correct—and there seems slight reason for doubting its occurrence in such forested areas as Karura or Ngong—specimens with precise locality data are badly needed. With a trans-continental range, though rare east of the Great Lakes, the Spotted Blind-snake is likely to be found in situations similar to those described for the worm-snakes, but only in forested, or recently deforested, country. In the Usambara Mountains, where a slightly differentiated race occurs, the Sambara say that the blind-snake is the "cow" of the *siafu* or driver-ants, claiming that the fierce insects protect the reptile until faced with a food shortage.

It is true that at times one may see a Spotted Blind-snake, unmolested by the workers and apparently protected by the soldiers, wriggling along in a column of the migrating marauders. One such procession was seen by Mr. F. W. Rogers at Amani, and a blind-snake taken under these

conditions was shown me by Mr. C. Clausen on Magrotto Mountain. Further careful observations are needed before we can say why the snake is apparently immune from attack by these insects which are a scourge to most living things.

Both worm-snakes and blind-snakes have vestiges of a pelvis, otherwise it might appear an unwarranted jump to go straight from these small species to the largest serpents. All are primitive, however, for in addition to internal remains of hind limbs most boas and pythons display on either side of the anal opening a small spur or claw. This constitutes the sole external evidence that hind limbs were once present in some remote ancestral stock.

Boas and Pythons (BOIDAE).

There is no large boa in Africa, the group being represented here by a two-foot-long, stout-bodied sand-boa. Its rather ugly looks are offset by beautiful colouring for the ground colour of the East African Sand-boa (*Eryx colubrina loveridgei*) is bright orange, and this is handsomely blotched with chocolate brown. This sturdy, stumpy-tailed reptile has a distinctly viperish appearance and it spends its time burrowing just below the surface of sandy or red laterite soil.

The inclusion of the sand-boa here is based on a single "near Nairobi" record, for I have never seen one in this neighbourhood. But the record may well be correct, for the sand-boa has a wide distribution in East Africa north of Moshi, and at Voi it might almost be called common. There I captured two adult females beneath the debris of a collapsed hut, a situation they were sharing with two female burrowing-adders (*Atractaspis microlepidotus*). Another female sand-boa was brought to me by a native who had found the reptile with her seven young ones in a hole on April 24th. One of these snakes had eaten a rat-like rodent or gerbil (*Dipodillus pusillus*), and Percival* records surprising another as it was attempting to swallow an Asiatic Dotterel or Caspian Plover (*Charadrius asiaticus*). The bird proved too large a mouthful so after two attempts the boa gave up the contest. A sand-boa, when disturbed, will discharge a very evil-smelling secretion from its cloacal glands. If this method of defence is ignored the snake is likely to follow it up with an unpleasant, though non-venomous, bite.

From its big relative the rock-python, a sand-boa may be readily recognised by the following external features:—

Top of head covered with small scales; shield on snout and foremost lip shields without pits; shields beneath tail in a single series ..... sand-boa.

Top of head covered with shields; shield on snout and foremost lip shields deeply pitted; shields beneath tail in a double series ..... rock-python.

Why the common Python (*Python sebae*) should be called rock-python rather than bush- or water-python, is not very clear. In East Africa, it is almost as well known by its Swahili name of *satu*, but African attempts to designate various colour forms by different names are unjustified. Not only is the coloration of this snake very variable, but to some extent the pattern is also. On the crown, however, is one constant and characteristic marking shaped like a spear-head. It is brown narrowly edged

*1916, *Journ. E.A. & U. Nat. Hist. Soc.*, No. 10, p. 127.

with black, which in turn is broadly bordered by pale pink. Each side of the head is streaked with brown and there is a more or less triangular blotch of the same beneath each eye. All such brown markings are likely to be edged with black. The back, which may vary from pale (in young) to very dark brown (in old examples), carries a chain of most irregular brown markings that sometimes form a ladder-like pattern, or coalesce with the series of brown blotches along the flanks. On the upper side of the tail is a narrow pale stripe bordered by black-edged brown ones. The white underside of a python is usually more or less speckled with black.

A python of seventeen and three-quarter feet has been recorded by Mr. Hugh Copley; this is fairly close to the authentic maximum. Skins, of course, far exceed these dimensions. I have measured as thirty feet the freshly removed skin of a python speared on the banks of the Ngerengere River, near Morogoro, Tanganyika Territory. Even when dried, skins are nearly a quarter (.21) as long again as the dead snakes from which they were taken. The fourteen-foot python from which this conclusion was drawn, weighed one hundred and thirty-five pounds, but then it had recently swallowed a bushbuck doe in calf.

At times the horns of goats, duiker, or other small antelope swallowed by adult pythons, break through the reptile's skin. Apparently the snake suffers no great inconvenience, and, when the skull has been digested away, the horns drop off and the wounds they caused soon heal. When Africans in the Nairobi district kill a gorged python, they frequently remove its last meal and, if fairly fresh, cook and eat it. It is rare indeed for pythons to kill people; that they do so at times is proved by the cases of the Mkerewe woman and youth to which I have referred elsewhere.* Dogs are often taken by medium-sized pythons, still younger snakes prey on rats and birds. As the prey is suffocated in the snake's coils before being swallowed, it is not surprising that captive pythons can soon be induced to swallow dead food and after a time even the skinned bodies of birds and animals.

Pythons are said to lay from thirty to fifty eggs around which the mother coils for about two months, leaving the eggs only to quench her thirst. During this incubating period the temperature of this poikilothermous reptile actually rises from ten to thirty degrees above the surrounding temperature. When the time comes for the developing python to emerge, it employs the temporary egg-tooth on its snout to make one or more slits in the tough, parchment-like covering that does duty as a shell. Forcing its way through one of the slits, the snakeling departs to pursue an independent life.

Ordinary Snakes (COLUBRIDAE).

Key only to the Species found in the Nairobi District.

(1) Shields beneath tail arranged in pairs 2
Shields beneath tail in a single series 12

(2) Scales on body each with a strong median ridge or keel; no teeth on upper and lower jaws in front of eye; pupil vertical; scales around midbody 23-27 ..... Common Egg-eater (p. 106)
Scales on body smooth or at most faintly keeled; teeth present on both upper and lower jaws in front of eye 3

Loveridge, 1933, *Bull. Mus. Comp. Zool.*, **74**, 206.

(3) Scales around midbody 25-33; pupil vertical ..... Common House-snake (p. 107)
Scales around midbody 15-21 4

(4) Pupil vertical 5
Pupil round 6

(5) Scales around midbody 17; shields on belly 184-214 ..... Cape Wolf-snake (p. 107)
Scales around midbody 19 (rarely 21); shields on belly 144-180 ..... White-lipped Snake (p. 109)

(6) Scales around midbody 21; shields on belly 175-204 ..... Semiornate Snake (p. 108)
Scales around midbody 15-17; shields on belly 110-186 7

(7) Scales around midbody 15 (very rarely 16) 8
Scales around midbody 17; shield covering anus usually divided 9

(8) Shield covering anus single; shields beneath tail 17-39; colour dark olive to blackish; habits terrestrial (secretive) ..... Abyssinian Slug-eater (p. 108)
Shield covering anus divided; shields beneath tail 77-114; colour light green; habits arboreal (bushes and trees) ..... East African Green-snake (p. 108)

(9) Shields beneath tail 140-144 ..... Schmidt's Tree-snake (p. 109)
Shields beneath tail 50-114 10

(10) Shields beneath tail 50-66; loreal shield (see Fig. 4) 1-1½ times as long as deep; back with three conspicuous brown stripes, the median narrowest ..... Northern Striped Schaapsteker (p. 109)
Shields beneath tail 78-121; loreal shield 1½-2½ times as long as deep; back uniform or with a fine yellow vertebral line 11

(11) Habit of adult stout; loreal shield 1½-2 times as long as deep; belly usually uniform white or plumbeous in adults, younger specimens often have lateral series of dusky dashes or spots; chiefly inhabits riverside bush ..... Common Hissing Sand-snake (p. 110)
Habit of adult slender; loreal shield 2-2½ times as long as deep; belly yellow with a conspicuous black longitudinal line on each side of it; inhabits dry scrub or thornbush country ..... Northern Stripe-bellied Sand-snake (p. 110)

(12) One or two labial shields (Fig. 4) on upper lip in contact with a parietal; head and body uniformly lead-coloured above ... Plumbeous Centipede-eater (p. 111)
Upper labial shields separated from parietal by temporals (Fig. 4); head black above, body pinkish brown or terra cotta coloured, with or without a fine black vertebral line ..... Jackson's Centipede-eater (p. 111)

Ordinary Snakes (COLUBRIDAE).

What may be called "ordinary snakes" comprise about two-thirds of the snakes of the world, if the total is assessed at 2,500 species altogether. At one time the cobras, coral-snakes, and their allies constituted a sub-family (Elapinae) of the COLUBRIDAE, but now these are recognised as a distinct family (ELAPIDAE). Already the sea-snakes had been removed and given family status as HYDROPHIIDAE, so that the 1,600 species left in the COLUBRIDAE may be considered as not dangerous to man with the exception of large examples of the Boomslang (*Dispholidus typus*).

For fifty years it has been the custom to divide the COLUBRIDAE on the basis of their teeth. The harmless ones with solid teeth were grouped in a section known as Aglypha, those with one or more grooved, and usually enlarged, teeth at the rear of the upper jaw were called Opisthoglypha. Recent researches tend to show that this division is an artificial one, for grooves appear to have developed independently in several unrelated groups of genera. The matter is further complicated by such reptiles as the Gray Centipede-eater (*Aparallactus modestus*) of Uganda and West Africa; in this species some individuals have solid teeth, in others they are grooved. Similar anomalies in other parts of the world have led to virtual abandonment of these groupings in recent systems of classification.

The teeth of one African snake, however, single it out from all its continental allies. I refer to the egg-eater which has lost all the teeth on the foreward part of both upper and lower jaws, retaining only a few posterior to the orbit. The explanation of this loss is that teeth are no asset to a snake which subsists solely on the eggs of small birds. It is probably the savannah-haunting Common Egg-eater (*Dasypeltis scaber scaber*) which occurs in the immediate vicinity of Nairobi, but at Kabete, Kiambu, etc., the all-black or all-brown rain-forest race (*D. s. palmarum*) is found.

The Common Egg-eater varies from pale sandy to olive brown, with numerous dark stripes or blotches on its flanks alternating with a dorsal series of large rhomboidal or squarish spots which sometimes coalesce to form a zigzag vertebral band. Both in colour and pattern this form of egg-eater so closely resembles the Rhombic Night-adder that the two are often confused by natives, and claimed as evidence of "mimicry" by Europeans. The dorsal scales of both species are keeled. The broad belly scales extend forward on the throat to an unusual degree in both reptiles, in one species to facilitate the swallowing of eggs, in the other, toads. There the resemblance ends for the adder is moderately broad-headed, a thick-set snake with short tail. The egg-eater, on the other hand, has a narrow head, a slender body, and a tapering tail, the total length averaging about eighteen inches.

An egg-eater likes its eggs fresh and cannot be induced to take one that has been incubated for any length of time. The state of the egg is ascertained by the snake touching it with the tips of its delicate forked tongue. The points transfer minute scent-bearing particles to receptacles in the roof of the mouth connected with the organs of smell.

A Boomslang (*Dispholidus typus*), engaged in robbing the nest of a Bronze Mannikin (*Spermestes cucullatus scutatus*) in a mango tree, was startled by a native passing below, lost its balance and fell at his feet. Though I called to the boy to desist, he had killed the snake before I could reach the spot. From its stomach I removed several slightly cracked eggs and fed them to a captive egg-eater which took them without

hesitation. One by one the eggs were swallowed and as each reached the gullet a slight muscular contortion brought into play some specialised device for cracking the egg open. Egg-eaters alone among snakes have certain downward pointing prolongations (hypophyses) of the "neck" vertebrae actually penetrating the gullet. When pressure is exerted they break the egg in much the same fashion that a nut-cracker opens a nut. The snake then raises its head and allows the fluid egg to flow on to the stomach. Once the fluid is safely past the pyloric valve, the snake lowers its head and spews out an elongate mass of neatly crumpled eggshell.

While a large egg-eater can swallow the egg of a domestic fowl, the normal diet of the species consists of entire clutches of small birds' eggs. During nesting seasons when eggs are plentiful the intestines of an egg-eater become filled with a turgid mass of yolk, and the reptile stores up quantities of fat that helps to tide it over the dry seasons when eggs are more difficult to obtain.

Except for the high number of scales around its middle, the egg-eater has little in common with the well-toothed house-snake (*Boaedon l. lineatus*). The latter's diet of mice and rats leads it to enter human dwellings in search of them—hence its name. Partly on this account, partly because of the abundance of rodents in Kenya, this active reptile appears to be the commonest snake in the Colony. Though frequently called "brown house-snake," often the adjective is applicable only to the young as the species darkens with age so that adults are generally black.

A full-grown house-snake may measure four feet, but it is quite unusual to meet with specimens of such a size. Several times at Parklands I have seized three-foot examples as they darted across the road. When captured, a house-snake bites savagely, at times leaving tiny pin-point teeth embedded in the skin of its captor's hand. Generally speaking, however, house-snakes soon tame in confinement though occasional individuals remain irascible and vicious to the last.

The boldness with which a house-snake will tackle a full-grown rat is little short of astonishing, a thirty-eight-inch snake, killed in a native hut at Kaimosi, held a roof rat (*Rattus rattus kijabius*) that measured seven and a half inches from tip of snout to root of tail, the tail itself was partially digested. At Kilosa, I observed a foot of snake's tail hanging from the stone basework of my house. Attempts to get the reptile out failed until some of the masonry was removed, then I found the snake had trapped itself by swallowing a large rat. Where rodents are scarce house-snakes will take other creatures. On Lamu Island, for example, they habitually swallowed frogs of various kinds (*Rana o. oxyrhynchus; Hemisus m. marmoratus*), and elsewhere on the Kenya coast, I have taken lizards representing three different families from the stomachs of house-snakes.

Eggs, usually laid between January and March, sometimes deposited in termite hills, may be as many as sixteen though about half that number is more usual. In size the individual eggs show some variation but are approximately an inch in length by half an inch in diameter. One hatchling measured nine and a quarter inches from snout to tail-tip.

Closely related to the house-snake is the more slender Cape Wolf-snake (*Lycophidion c. capense*). It was the sight of one's tail protruding from between the sheets of galvanised iron forming one side of an out-building at Nairobi, that led to the capture of my first wolf-snake. The reptile was a leaden hue lightened by a pale speck on the centre of each scale; an occasional large example may be jet black. For some reason or other one rarely meets with wolf-snakes over a foot in length, though I have taken a yard-long specimen in Tanganyika.

The small size of the majority is probably responsible for their diet being restricted chiefly to lizards, of which I have recovered ten different species from wolf-snakes' stomachs. As these lizards, chiefly skinks, seek shelter under boards or beneath piles of garden refuse, it is there that wolf-snakes are to be found. Usually a wolf-snake lays less than seven or eight eggs; they measure about three-quarters by three-eighths of an inch.

The Semiornate Snake (*Meizodon semiornata*) is a somewhat slender, almost blackish, olive-brown reptile. Adults of two feet in length are nearly uniform above, but younger snakes display a series of vertical, black stripes on either side of the foreward part of the body. There are also vertical black bars or blotches on the otherwise white or yellowish upper lips. The colouring of the underside ranges from yellowish to plumbeous.

In Kenya, the Semiornate Snake has been recorded from such widely scattered places as Lake Rudolf, Nyeri, Kijabe, Juja Farm, Kibwezi, Voi, Mombasa, and Malindi. Nowhere common, this secretive and inoffensive species is usually found under piles of rotting vegetation. It is there the snake finds the geckos (*Hemidactylus gardineri*) and skinks (*Riopa m. modestum*) upon which it preys. A female, taken at Kibwezi at the end of March, held two elongate eggs measuring an inch and three-quarters by three-eighths.

Equally secretive is the Abyssinian Slug-eater (*Duberria lutrix abyssinica*), a small olive, brown, or blackish reptile with flecks of white upon its sides and often a fine black vertebral line. No thicker than an ordinary lead pencil, it is rare for a slug-eater to exceed a foot in length, though I caught a female eighteen inches long in the Ruanda highlands of south-west Uganda. The only records of its occurrence in Kenya besides Nairobi, are from the Kinangop Plateau; Aberdare Mountains; Nyeri; and Meru.

In such cool surroundings at altitudes between 3,000 and 10,000 feet, the gentle little slug-eater emerges to bask on short grassy tussocks into which it wriggles when disturbed. Apart from squirming, it makes little objection to being removed from its refuge. The species certainly deserves protection, for its diet is almost exclusively confined to slugs. From six to a dozen young are produced each season, or possibly twice a year.

Probably few serpents are more familiar to Nairobi residents than the East African Green-snake (*Chlorophis neglectus*). No fewer than five of these beautiful little reptiles were killed in one garden on the Hill during the course of a morning just because the lady of the house "didn't like snakes." Yet even the Kikuyu regard green-snakes as harmless. In some parts of the country, of course, there is the danger of mistaking green-snakes for the young of the very venomous green mamba, but fortunately that reptile has not been found around Nairobi so far as I am aware.

Once I was summoned to catch a young green-snake which had thrust its head out of a leather hair-brush case lying on a sunny dressing table in Sixth Avenue. The snake had gained admission to the room from creepers that flanked the open casement. One could always count on finding some green-snakes stretched out on sprays of the bushes that fringed, or overhung, the Nairobi River, into which they would quietly slip when disturbed. One was caught in the act of swallowing a frog, for it is on different species of *Arthroleptis* and *Rana* that these snakes chiefly prey. In young green-snakes, however, I have found small skinks (*Ablepharus wahlbergii*), a buprestid beetle, and a grasshopper's leg.

From five to seven eggs, each measuring about three-quarters by three-eighths of an inch, are laid at a time, probably towards the end of the

rains. Just at first the hatchling snakes are much darker than the adults, which are a uniform rich green above and pure white below. While an average-sized snake measures twenty inches, an occasional specimen may be as much as thirty inches. Among the many places in which this snake has been taken in Kenya, one might mention Tumutumu, Fort Hall. Nakuru, Kabete, and Mtito Andei.

Another climbing snake (*Thrasops jacksonii schmidti*), prefers trees to bushes, and is known from four examples only. A half-grown greyish-white reptile from Meru Boma is greyer beneath the tail, the terminal portion carrying a still darker grey median line. A uniformly black adult, nearly seven and a half feet in length, was killed at Muthaiga, in 1919, by the late A. J. Klein who presented it to what is now the Coryndon Memorial Museum. The black adults so closely resemble the black phase of the venomous Boomslang (*Dispholidus typus*) that an examination of the teeth is necessary to establish its identity.

Of the habits of this eastern race nothing is known, but the typical (western) form, which is common at Kaimosi, seems almost omnivorous. From their stomachs I have recovered an arboreal rat, a bird, an agama lizard, and three species of chameleons. The number of eggs produced ranged from seven to twelve, the largest of them measured about one and a half by five-eighth inches.

The White-lipped Snake (*Crotaphopeltis h. hotamboeia*) is black above freckled with minute white spots that help to distinguish it from the house-snake; underneath it is white. This common species is usually two feet in length, but occasionally individuals over three feet are to be found. It is the first back-fanged snake to be discussed here, and, though the fangs are probably set too far back to cause harm to a human hand, I prefer to pick up a White-lipped Snake by the back of the neck, according it that respect which its appearance would seem to warrant. For a White-lipped Snake, on being disturbed, hisses noisily, inflates its body so that the white spots assume greater prominence, flattens its head to a triangular shape, and then strikes out vehemently in a most vicious manner.

As White-lipped Snakes are largely nocturnal, they seek shelter by day under rubbish heaps or discarded building material. There they are likely to find the toads, frogs, and occasional gecko or pigmy mouse on which they live. It is also among vegetable rubbish, and in similar situations, that they lay their eggs. These range from three to six in number; the largest I have measured was one and a quarter by three-eighths of an inch.

Northern Striped-schaapsteker (*Trimerorhinus tritaeniatus multisquamis*) is a poor name for so docile a reptile whose bite would not hurt a lamb. But "sheep-sticker" is the title conferred by the Boers on the southern form which ranges from South Africa northwards to the Central Railway of Tanganyika Territory. Both races are grey, olive, or pale brown above, usually with three well-defined lines of darker brown, edged with black, extending from the head to the tip of the tail. Sometimes the middle line is separated by a fine, hair-like, yellow one down its centre; more rarely it may be indistinct or absent. On either side the lateral line is interrupted by the eye; the lips and lower parts are pure white.

The Northern Striped-schaapsteker does not seek safety in full flight if disturbed. Instead it makes for the nearest grass-enveloped shrub and, concealing itself at the base, defies all efforts to drive it out; so much does it rely on remaining quiet for protection that often it can be picked up with ease. Once seized, it flattens its body to a surprising extent, thrashes about, and may even bite, though this is unusual. The bite, while drawing blood, is not followed by any symptoms of poisoning.

Though rodents, and even a shrew, may be eaten by schaapstekers, their food in the main consists of frogs and skinks. One Nairobi snake, a fortnight after being captured, attempted to eat a dead Striped Skink (*Mabuya striata*) that I had put into its cage. For thirty minutes the snake perseveringly tried to swallow the lizard, but failing to get past the front legs eventually disgorged it. Though the head of this snake is small and scarcely broader than the neck, probably an adult thirty-one-inch schaapsteker could have managed the skink. That females under twenty inches long may breed is shown by a couple on Kinangop, each of which held about seven eggs on October 27th.

Elsewhere in Kenya this grassland species is known from Guaso Nyiro; Molo; Nakuru; Lake Naivasha; Kiambu; Juja Farm; the Loita, Athi, and Kapiti Plains; Mtito Andei; and Voi.

The Common Hissing Sand-snake (*Psammophis s. sibilans*) may be olive, brown, or yellowish. In young individuals the head is ornamented with black-edged longitudinal streaks anteriorly, transverse ones posteriorly. As the reptile grows these markings disappear until it is uniformly coloured above except for the yellowish white lips, which are rather characteristically spotted with grey. Below, it is plumbeous grey or yellowish white, uniform, or in young examples with a series of dusky lateral dashes longitudinally arranged. The species reaches a length of five feet and the thickness of a broom handle.

In Kenya, the Hissing Sand-snake has been recorded from thirty-four localities between Mount Elgon and Mombasa. It appears capable of adapting itself to a wide variety of habitats from coastal plain to upland savannah at 7,000 feet, showing a preference for well-watered country but shunning rain forest. Temperamentally I should call it irascible, but as it uses its teeth in self-defence perhaps it would be fairer to commend the sand-snake for its love of freedom.

Young sand-snakes feed on frogs and lizards, but older ones prefer rodents and shrews; altogether I have recovered fifteen different species from the stomachs of dead sand-snakes. Almost as diverse as their prey are their enemies and parasites, among which are the Black-collared Cobra and three species of eagles—both harrier and fishing.

It is doubtful if any two species of snakes are harder to distinguish than some individuals of the Common Hissing Sand-snake and the Northern Stripe-bellied Sand-snake (*Psammophis subtaeniatus sudanensis*.) Yet a typical example of the latter is distinct enough with its yellow belly flanked on either side by a *sharply defined* black line bordered externally by a white band. Above, the reptile may be brown or olive with a light vertical line extending across the snout to the posterior end of the frontal shield, where it meets with the first of three light transverse stripes crossing the hinder part of the head. Usually seven middle scale-rows of the back are darker and edged with black, and a fine yellow vertebral line may, or may not, be present.

The Stripe-bellied Sand-snake is definitely more slender than its relative, but this is not noticeable in young specimens. The length rarely exceeds three feet though the record is four feet three inches for a Uganda snake collected by C. R. S. Pitman. The Stripe-bellied Sand-snake is not savage even if it does bite freely when first captured; no ill-effects whatever resulted from the bites I received.

The habitat preference of the stripe-bellied species differs from that of the Hissing Sand-snake, for it favours dry savannah with scattered bush. Being an adept climber it suns itself among the twigs and is difficult to detect as it harmonises so well with its environment. A snake disturbed

in thorn-bush country, flashed across my path and was twenty feet up in the topmost twigs of a stunted tree in a matter of moments. I captured others in the thatches of native huts where they had gone in search of lizards

Frogs, and now and then a mouse or bird, are also eaten. At Frere Town one day my native collector brought in a warbler (*Prinia mistacea tenella*) whose head had been partially shot away. It was useless as a specimen so I dropped it into a small biscuit tin (measuring about five by five by eight inches) in which was a sand-snake I had caught the day before after a hard chase. When I opened the tin next morning there was a bulge in the snake but no sign of the bird. This freshly-caught diurnal snake had eaten a damaged dead bird in the darkness and confinement of a small tin on the day succeeding capture!

Both species of sand-snakes produce the same number of eggs—four to ten, which, in the case of the stripe-bellied species are laid in late October. Those in one batch measured one inch and a quarter by half-an-inch. Sixteen hatchlings were captured between December 10th and January 1st, and in their convulsive efforts to escape two of these hatchlings actually leapt off the ground. Five adults were recovered from the stomachs of harrier-eagles (*Circaetus cinereus*).

The Northern Stripe-bellied Sand-snake has been taken on the Athi Plains outside Nairobi, and is known from a score of places in the eastern half of the Colony from Lake Rudolf to the borders of Tanganyika Territory. The southern or typical race occurs south of the Zambesi.

Neither of the remaining opisthoglyphous snakes can open their mouths wide enough to bite a human finger. Both subsist on centipedes. One Plumbeous Centipede-eater (*Aparallactus concolor*) is reported to have swallowed a centipede as long as a finger and nearly the same diameter as the snake itself. That would be a little thicker than a pencil, while the largest known specimen, a female which I took at Voi, measured twenty and a half inches. This slender snake, as suggested by its name, is uniformly plumbeous above; below it is somewhat paler, sometimes almost white. It occurs on the Athi Plains though in general it is found in even drier regions like Turkana, Tsavo, and Voi.

The inclusion of Jackson's Centipede-eater among Nairobi snakes, is justified by a specimen in the Coryndon Museum which I found on Kell's Farm thirty years ago. It has been taken at Naivasha and recorded, probably in error, from Lamu; south of the border it is not uncommon. There I used to find them beneath stones and logs in the scattered acacia forest of the hot upland steppe. It was one of these inoffensive little snakes that attempted to cross the face of a recumbent trooper when the East African Mounted Rifles were encamped at the foot of Mount Meru.

An eleven-inch male from the foothills of Mount Longido is the longest known example of Jackson's Centipede-eater. In this species the top of the head is black and on the nape is a broad black band edged before and behind by scale-wide bands of bright yellow. The back and tail are a delicate pinkish brown or terra cotta with, or without, a fine black vertebral line, more rarely along the sides is a series of white scales bordered with black above and below. The underside is bright yellow or white.

Coral-snakes and Cobras (ELAPIDAE).

The mambas also belong to this family for its members comprise those land snakes at the front of whose mouths is one pair, rarely two, of enlarged, grooved teeth for the conduct of venom. In some species a canal

can be seen down the front of the tooth, in others the fissure is closed with calcium so that the tooth is almost tubular like a viper's. However, in elapid snakes more or less of a groove remains, and the tooth is semi-rigid instead of folding back along the palate.

Elapids are most numerous in Australia where there are approximately sixty kinds; in the Americas nearly as many but all are coral-snakes; in Africa elapids are not quite so numerous. In British East Africa there are but two races of coral-snakes, two species of mamba, and six cobras of which one is semi-aquatic. Both elapids known from the Nairobi district have their scales arranged obliquely (see Fig. 1, B), but may be distinguished as follows:—

Scales around midbody 13; length of tail included in length of head and body more than eight times; cannot spread a hood	Günther's Coral-snake.
Scales around midbody 21; length of tail included in length of head and body not more than five times; spreads a hood only when excited	Black-collared Cobra.

Günther's Coral-snake (*Elapsoidea sundevallii guntherii*) is sometimes called a garter-snake. This second name is unfortunate, for it is likely to result in confusion with the harmless garter-snakes that are so abundant in North and Central America. The half-dozen Nairobi specimens that I caught all had coral pink or red centres to the numerous white crossbands that enliven the black or plumbeous grey body and tail. Elsewhere in the Colony, I came across almost uniformly black specimens which, when annoyed, by inflation of their lungs brought into prominence the previously hidden white-tipped bases of certain scales, thus producing an annulate effect that is quite startling.

Temperamentally, however, Günther's Coral-snake is peaceable and inoffensive, only biting when really provoked. In Parklands Forest Reserve, I nearly trod on one sluggishly making its way through the sparse herbage that had sprung up with the advent of the rains. Though elsewhere this race has an extensive distribution from sea-level to 7,000 feet, in Kenya it seems to prefer the highlands where it is known from Guaso Nyiro; Burnt Forest; Kakamega; Njoro; Kijabe; and Loita Plains. One Kaimosi coral-snake measured just over two feet in length, but this is unusually large.

Though this coral-snake is not uncommon, next to nothing is known of its habits. The only dietetic record for the race is a note that there were four lizard eggs, each measuring about five-sixteenths by three-sixteenths of an inch, in the stomach of a coral-snake that I found wriggling along in a ditch on Sixth Avenue. It is to be hoped that some member of the Natural History Society will endeavour to fill the gaps in our knowledge by keeping some of these coral-snakes in captivity and supplement any observations made by studying their habits in the field.

The Black-collared, or Black-necked Cobra (*Naja n. nigricollis*) is certainly one of the most variably coloured snakes. In Nairobi, there is an olive-coloured form with lemon-yellow markings on its throat; the common slatey-black variety is also present, and young cobras are usually greyish, or slatey-grey, with pink bars on their throats. In the red laterite country extending from Lake Rudolf southwards through Kibwezi and Tsavo to Mount Longido, occurs a salmon-pink to rich red phase distinguished by its more numerous scale-rows. These number twenty-seven and justify

the recognition of a geographical race that, rather unfortunately, has been named *Naja n. pallida,* because the fugitive red had disappeared from the preserved snake on which the original description was based.

It is not often that one meets with a Black-collared Cobra over four feet in length, though they do grow to seven feet in remote districts. Only the equally large Egyptian Cobra (*Naja h. haje*) is likely to be confused with it. As the Egyptian Cobra has been found at Thika, there seems no reason why it should not turn up nearer Nairobi. An examination of the eye in relation to the upper lip scales makes it easy to distinguish between the two reptiles.

Eye in contact with the third or third and fourth upper labials, which are the largest ..... Black-collared Cobra.

Eye separated from the upper labials by suboculars; sixth or seventh upper labial largest and deepest ..... Egyptian Cobra.

Apparently the Egyptian Cobra lacks the ability to eject its venom, a habit which has made the Black-collared Cobra as feared as the Ringhals of the Transvaal. The rapidity and precision with which a cornered cobra "spits" is truly remarkable. Throwing back its head to the correct angle, it ejects the venom from its fangs with such force that the twin jets of fluid carry to a distance of six feet or more. The discharge of the poison is accompanied by a sharp hiss that has the effect of spraying the venom at the face of the snake's opponent.

Several times when shielding my eyes with my bare arm I have had the venom fall upon it and my neck, where it does no harm unless there is a scratch or abrasion present. The effect on the eyes, however, is instantaneous agony. Blinding tears course over the burning eyeballs as the venom is rapidly absorbed by the tiny superficial blood vessels. Unless the venom is washed off promptly—milk or plain water will do—the sight may be affected permanently. Dogs that have been targets, frequently go blind, for, being closer to the cobra they receive a more concentrated discharge of the poison.

Mammals, birds, reptiles, and amphibians are alike included in the menu of the Black-collared Cobra. Doubtless this wide range of food explains in part their comparative abundance and extensive distribution. In search of eggs, chickens, and rodents, the cobra visits human dwellings where it is frequently found in sheds, fowl houses, rubbish heaps, and even tents. In open country they take up their abode in termite heaps, upon which they like to lie and bask in the morning sunshine.

Termitaria are known to be one of the situations chosen by these cobras in which to deposit their eggs. I have never found any, but in September, 1920, a captive snake laid ten, each of which measured about one and three-eighths inches by three-quarters of an inch. They were brought to the Museum by an itinerant snake-charmer then living in Nairobi.

Adders and Vipers (VIPERIDAE).

Members of the VIPERIDAE are characterised by the possession of tubular fangs that bear a marked resemblance to a hypodermic needle. When the mouth is closed these long fangs lie along the palate, but are raised when required by rotation of the abbreviated maxillary bone to which they are fused. Normally there are just a pair—one on each side of the front of the mouth, but occasionally a replacement pair moves into position before the functional pair is shed.

Since the separation of the New World pit-vipers into a distinct family (CROTALIDAE), the distribution of true vipers is restricted to Europe, Asia, and Africa. The name viper is given in allusion to the ovo-viviparous mode of reproduction of the great majority of species that give birth to live young. This is true of four of the Kenya genera, but does not apply to the egg-laying *Atractaspis* and *Causus* for whom it might be well to reserve the name adder, derived from the Anglo-Saxon *naedre*, if it were not so inseparably linked with the commonest African viper, the puff-adder.

It is surprising that no burrowing-adders (*Atractaspis*) have been reported from Nairobi forests, for one species occurs on Mount Kenya and others are known from east, west, and south of the capital. These very venomous, but unviperish reptiles, have small heads no broader than the slender attenuated body; the colour of most species is black. In the undermentioned key they would answer best to the night-adder, but may be distinguished from it by having more than two hundred belly shields, apart from the subcaudals beneath the rather short tail.

Top of head covered with large shields; pupil of eye round; 17-21 scales around midbody ..... Rhombic Night-adder.

Top of head covered with small scales; pupil of eye vertical; 29-41 scales around midbody ..... Puff-adder.

The Rhombic Night-adder (*Causus rhombeatus*) is usually about eighteen inches long, though examples measuring two and a half feet are known; in girth it is approximately the thickness of a man's thumb. The colour varies from pale brown to olive; on the crown is a dark arrow-head or Λ-shaped marking with its point resting on the frontal shield; along the back are a series of light-edged, dark, irregular markings, that may, or may not, be rhomboidal. The shields on the underside are grey or yellowish white, uniform or each shield with a dusky edge.

This night-adder ranges over most of tropical and South Africa outside the forest areas, in Nairobi it is one of the commonest snakes. It spends the day in rubbish heaps, piles of stones, or among the litter of outbuildings. Towards evening it emerges from its retreat, and is then most frequently encountered as it crosses paths or roads. If intercepted it will coil and strike viciously until, having intimidated the aggressor to its satisfaction, it moves off with neck flattened cobra-fashion and head raised about five inches from the ground.

Apparently the diet of night-adders consists chiefly of toads, notwithstanding the acrid secretions that cause these amphibians to be avoided by most animals. I have seen a captive night-adder take in quick succession seven small toads, each about the size of a thimble. Another snake took nine very small toads, three small ones, and a rather large frog, all in the course of a week. A week later I chloroformed this adder and found everything had been digested except the feet of the frog.

The venom, which presumably assists the adder in overpowering the toads, is produced in unusually elongate glands. In most snakes these glands are almond-shaped and confined to the head, but in the Rhombic Night-adder extend along either side of the back for almost a quarter of the length of head and body. The venom produces serious symptoms in man, but is rarely fatal for adults. On the other hand the child of a European missionary at Rungwe died from the bite of a night-adder.

The Rhombic Night-adder lays from one to two dozen eggs, and, in captivity at least, coils about them. Further observations are required to establish whether the snake registers a definite rise in temperature and maintains her guardianship until the eggs hatch. At Fort Hall, a Chanler's File Snake (*Mehelya c. chanleri*), about four feet in length, was killed in the act of swallowing a night-adder half its own length. The interesting pair are preserved in the Coryndon Memorial Museum.

The Puff-adder (*Bitis arietans*) has a trans-African range from Southern Morocco to the Cape, outside forest areas. Naturally so widely distributed a species shows many different types of coloration. The basic colour of some is chocolate-brown, of others reddish brown, and less commonly lemon-yellow, with a variegated pattern chiefly consisting of a series of light-edged, dark, V-shaped markings along the back. The largest I have collected was a fifty-five-inch male, weighing six pounds, from Mkonumbi near Lamu, but the species is said to reach five feet, though such monsters are undoubtedly rare today.

When unmolested the average Puff-adder is a sluggish reptile whose colour harmonizes so perfectly with its surroundings that there is a real danger of the snake being trodden upon and hurt by ornithologists, lepidopterists, and others whose attention is directed elsewhere. Then the snake swells visibly by inflating its lungs, and hisses and blows in the vigorous manner that has earned it the name of Puff-adder. This is the reptile's way of warning that it is about to strike, for with startling suddenness it lunges forward, or sidewards, the mouth flashes open, and the snake recoils on the defensive. It is all over so quickly that it is easy to understand the faulty observation responsible for the statement that a Puff-adder strikes backwards.

I was once struck a glancing blow on the thumb by one fang of a Puff-adder I had just released; no symptoms of poisoning resulted. Alternatively a native who was struck by one fang on the knuckle at the base of the index finger of his left hand, had a very bad time. Within five minutes of being bitten Abedi was in hospital, where potassium permanganate was applied to rather superficial incisions at the site of the bite. Though bitten at 9 a.m., he showed no signs of poisoning the first day except for a certain amount of drowsiness. The next day his arm swelled gradually from the hand to the shoulder till, when I saw him at 4 p.m., it was enormous. About this time some antivenin was procured and injected. The medical officer told me that the man's condition was decidedly precarious, and he doubted if the antivenin, being injected so long after the fellow had been bitten, had much effect one way or the other. No information was available on the type of antivenin used and if it was Calmette's serum based on the Indian cobra it may well have been useless. Nevertheless, on the fifth day the patient was so far recovered that he was able to rise and wash himself, and thereafter his condition improved steadily. The doctor inclined to the opinion that he had received a non-lethal dose and might well have recovered without any treatment.

The stomach of one young Puff-adder held an orthopteran, but they soon begin to take young toads and mice. An adult Puff-adder that I caught, had eaten quite a large bird to judge by the undigested quills in its stomach, in general, however, the larger adders prey on full-grown rats. The maximum number of eggs or embryos that I found in one of these snakes was seventy-one.